

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re U.S. Patent Application)
)
Applicant: Sugiura et al.)
)
Serial No.)
)
Filed: January 18, 2002) -
)
For: REFLECTION TYPE)
 LIQUID CRYSTAL DISPLAY)
 DEVICE AND)
 MANUFACTURING METHOD)
 THEREOF)
)
Art Unit:)

*I hereby certify that this paper is being deposited with the
United States Postal Service as EXPRESS MAIL in an
envelope addressed to: Assistant Commissioner for
Patents, Washington, D.C. 20231 on
January 18, 2002*
Express Label No.: EL 846163259 US
Signature. *David Cane*

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

Dear Sir:

Prior to calculation of the filing fee and examination of this application, please amend the application as follows.

IN THE CLAIMS:

Please cancel claims 4, 9, 12, 14, 19, 25, 29, 31, 35, 39, 44, 46, 47, 50, 57, 58, 61, 62, 64, 66, 67, 68, 70, 72 and 74, without prejudice.

Please amend the following claims to read as follows:

17. (Amended) The reflection type liquid crystal display device according to Claim 15, wherein the existence probability along said first direction has one peak in a $15^\circ - 19^\circ$ range, and the existence probability along said second direction has a peak in a $15^\circ - 19^\circ$ range and $0^\circ - 14^\circ$ range respectively.

18. (Amended) The reflection type liquid crystal display device according to Claim 15, wherein the existence probability along said second direction has a peak in a first angle range and a second angle range in a first area, and the existence probability along said second direction has a peak in said first angle range and a third angle range in a second area in each pixel area of the display face.

27. (Amended) The reflection type liquid crystal display device according to Claim 24 or Claim 26, wherein a direction of refractive index anisotropy of said liquid crystal layer changes according to the electric field to be applied, a transparent prism-shaped undulated layer is disposed between one of said transparent substrates and said liquid crystal layer, and a refractive index of said undulated layer matches with one refractive index of the liquid crystal layer.

28. (Amended) The reflection type liquid crystal display device according to Claim 24 or Claim 26, wherein said transparent electrodes are separated into a plurality of

parts and voltage is selectively applied to a separated transparent electrode, so as to adjust the degree of light scattering of said liquid crystal layer.

32. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 30, wherein the exposure time is adjusted to expose said resin layer using an arbitrary mask pattern when the distribution of the thermal deformation characteristics of said resin layer is adjusted, so that the film thickness of said resin layer is distributed and said undulation shape of said resin layer is controlled.

33. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 30, wherein when at least one type of composing elements to be disposed on the surface of said substrate is formed, the distribution of thermal deformation characteristics of said resin layer is adjusted and said undulation shape of said resin layer is controlled using said composing elements by setting at least one of number, shape and arrangement of said composing elements to a desired value.

36. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 34, wherein said part is formed by forming a resin layer having a predetermined shape with different thermal deformation characteristics in said resin layer.

37. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 34, wherein said part having different thermal deformation characteristics is formed by performing partial processing on said resin layer.

40. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 38, further comprising a fourth step of performing heat treatment to said resin layer before said first step.

41. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 38, wherein said resin layer is patterned before said first step.

42. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 38, wherein an undulation pattern is formed on said substrate before said first step.

45. (Amended) The reflection type liquid crystal display device according to Claim 43, wherein at least one of number, shape and arrangement of comprising elements disposed on the surface of said substrate is set to a desired value and an area having a

different distribution of said undulation is formed corresponding to said setting.

48. (Amended) The reflection type liquid crystal display device according to Claim 45, wherein the average inclination angle of said undulation of said resin layer is a value between 8° and 13°.

51. (Amended) The reflection type liquid crystal display device according to Claim 49, wherein said part is comprised of particles having different thermal deformation characteristics in the resin layer.

52. (Amended) The reflection type liquid crystal display device according to Claim 49, wherein said part is comprised of another resin layer having different thermal deformation characteristics layered in said resin layer.

53. (Amended) The reflection type liquid crystal display device according to Claim 49, wherein said part is comprised of another resin layer having different thermal deformation characteristics formed into a predetermined shape in said resin layer.

63. (Amended) The reflection type liquid crystal display device according to Claim 59 or Claim 60, wherein an optical element to improve directivity of light is

disposed in said light guiding plate.

69. (Amended) The illumination device according to Claim 65, wherein said low refractive index layer and said transparent conductive film are formed on said light guiding plate side face of the transparent element disposed at the observer side of said light guiding plate, and said low refractive index layer and said light guiding plate contact each other at least in a part of the area.

73. (Amended) The illumination device according to Claim 71, wherein an optical element to improve a directivity of light is disposed in said light guiding plate.

REMARKS

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **“Version with markings to show changes made.”**

Applicants respectfully request these claims be considered with the examination of this application.

Respectfully submitted,

GREER, BURNS & CRAIN, LTD.

By



Patrick G. Burns
Registration No. 29,367

January 18, 2002

300 South Wacker Drive
Suite 2500
Chicago, Illinois 60606
Telephone: (312) 360-0080
Facsimile: (312) 360-9315
Customer Number: 24978

K:\3408\65878\amend pre.doc

VERSION WITH MARKINGS TO SHOW CHANGES MADE**In the Claims:**

The following claims have been amended as follows:

17. (Amended) The reflection type liquid crystal display device according to Claim 15 [or Claim 16], wherein the existence probability along said first direction has one peak in a 15° – 19° range, and the existence probability along said second direction has a peak in a 15° – 19° range and 0° – 14° range respectively.

18. (Amended) The reflection type liquid crystal display device according to Claim 15 [or Claim 16], wherein the existence probability along said second direction has a peak in a first angle range and a second angle range in a first area, and the existence probability along said second direction has a peak in said first angle range and a third angle range in a second area in each pixel area of the display face.

27. (Amended) The reflection type liquid crystal display device according to [any one of] Claim 24 [to] or Claim 26, wherein a direction of refractive index anisotropy of said liquid crystal layer changes according to the

electric field to be applied, a transparent prism-shaped undulated layer is disposed between one of said transparent substrates and said liquid crystal layer, and a refractive index of said undulated layer matches with one refractive index of the liquid crystal layer.

28. (Amended) The reflection type liquid crystal display device according to [any one of] Claim 24 [to] or Claim 26, wherein said transparent electrodes are separated into a plurality of parts and voltage is selectively applied to a separated transparent electrode, so as to adjust the degree of light scattering of said liquid crystal layer.

32. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 30 [or Claim 31], wherein the exposure time is adjusted to expose said resin layer using an arbitrary mask pattern when the distribution of the thermal deformation characteristics of said resin layer is adjusted, so that the film thickness of said resin layer is distributed and said undulation shape of said resin layer is controlled.

33. (Amended) The method of manufacturing a reflection type liquid crystal display device according to [any one of Claims] Claim 30 [to 32], wherein when at least one type of composing elements to be disposed on the surface of said substrate is formed, the distribution of thermal deformation

characteristics of said resin layer is adjusted and said undulation shape of said resin layer is controlled using said composing elements by setting at least one of number, shape and arrangement of said composing elements to a desired value.

36. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 34 [or Claim 35], wherein said part is formed by forming a resin layer having a predetermined shape with different thermal deformation characteristics in said resin layer.

37. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 34 [or Claim 35], wherein said part having different thermal deformation characteristics is formed by performing partial processing on said resin layer.

40. (Amended) The method of manufacturing a reflection type liquid crystal display device according to Claim 38 [or Claim 39], further comprising a fourth step of performing heat treatment to said resin layer before said first step.

41. (Amended) The method of manufacturing a reflection type liquid crystal display device according to [any one of] Claim 38 [to Claim 40], wherein said resin layer is patterned before said first step.

42. (Amended) The method of manufacturing a reflection type liquid crystal display device according to [any one of] Claim 38 [to Claim 41], wherein an undulation pattern is formed on said substrate before said first step.

45. (Amended) The reflection type liquid crystal display device according to Claim 43 [or Claim 44], wherein at least one of number, shape and arrangement of comprising elements disposed on the surface of said substrate is set to a desired value and an area having a different distribution of said undulation is formed corresponding to said setting.

48. (Amended) The reflection type liquid crystal display device according to [any one of] Claim 45 [to Claim 47], wherein the average inclination angle of said undulation of said resin layer is a value between 8° and 13°.

51. (Amended) The reflection type liquid crystal display device according to Claim 49 [or Claim 50], wherein said part is comprised of particles having different thermal deformation characteristics in the resin layer.

52. (Amended) The reflection type liquid crystal display device according to Claim 49 [or Claim 50], wherein said part is comprised of another

resin layer having different thermal deformation characteristics layered in said resin layer.

53. (Amended) The reflection type liquid crystal display device according to Claim 49 [or Claim 50], wherein said part is comprised of another resin layer having different thermal deformation characteristics formed into a predetermined shape in said resin layer.

63. (Amended) The reflection type liquid crystal display device according to [any one of] Claim 59 [to] or Claim [62] 60, wherein an optical element to improve directivity of light is disposed in said light guiding plate.

69. (Amended) The illumination device according to Claim 65 [or Claim 67], wherein said low refractive index layer and said transparent conductive film are formed on said light guiding plate side face of the transparent element disposed at the observer side of said light guiding plate, and said low refractive index layer and said light guiding plate contact each other at least in a part of the area.

73. (Amended) The illumination device according to [any one of] Claim 71 [67 to Claim 72], wherein an optical element to improve a directivity of light is disposed in said light guiding plate.